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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/734,479 | 12/12/2003 | Eun-Tack Yim | 2522-042 | 9601 |
| 20575 | 7590 | 04/04/2006 | EXAMINER | |
| MARGER JOHNSON & MCCOLLOM, P.C. 210 SW MORRISON STREET, SUITE 400 PORTLAND, OR 97204 | | | CHAUDHRY, SAEED T | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1746 | |
| DATE MAILED: 04/04/2006 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

Cur

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|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/734,479 | YIM ET AL. | |
| | Examiner | Art Unit | |
| | Saeed T. Chaudhry | 1746 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 20-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 and 22-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3/14/05, 12/12/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restriction

Applicant's election without traverse of Group I, claims 1-19 and 22-25 in Paper No. 01/20/2006 is acknowledged.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. § 119, which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5, is indefinite and confusing since it is not clear when and where the additional gas is introduced. Is the additional gas is provided with the first gas or second gas or separately in another step.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- (c) he has abandoned the invention.
- (d) the invention was first patented or caused to be patented, or was the subject of an inventor's certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor's certificate filed more than twelve months before the filing of the application in the United States.
- (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by

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another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

(f) he did not himself invent the subject matter sought to be patented.

(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

Claims 1-4, 8-10 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by

Williams et al.

Williams et al (5,647,953) disclose a method for cleaning CVD chamber having aluminum oxide attached to the interior surface by introducing first gas and then introducing second gas to remove reacting residue from the chamber.

A plasma cleaning method for removing oxide residues in a plasma process chamber wherein substrates are processed, comprising steps of: introducing a cleaning gas comprising a fluorine-based gas into the plasma process chamber; performing a plasma cleaning step by activating the cleaning gas and forming a plasma cleaning gas, contacting interior surfaces of the chamber with the plasma cleaning gas for a time sufficient to remove oxide residues on the interior surfaces; and introducing a conditioning gas comprising a hydrogen-containing gas into the chamber, contacting the interior surfaces with the conditioning gas in a non-plasma state for a time sufficient to remove fluorine from the interior surfaces. Wherein the fluorine-based gas comprises NF_3 , SF_6 , a fluorocarbon or mixture thereof. Wherein the oxide residues are removed by the plasma cleaning gas. Wherein the interior surfaces are maintained at a temperature below 100.degree. C (see claims).

The conditioning step is carried out to remove fluorine from interior surfaces which are not coated in the coating step. Preferably, the fluorine is converted to SiF_4 and/or HF_4 . The non-

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plasma conditioning gas includes a hydrogen-containing gas and preferably hydrogen and silicon-containing gas such as SiH_4 which is introduced into the chamber in a non-plasma state. The non-plasma conditioning gas can be passed through the reactor as a purge gas or the non-plasma conditioning gas can be introduced into the chamber so as to build up pressure in the chamber followed by suddenly evacuating the chamber. In the latter case, loose particles can be advantageously removed from the chamber along with the SiF_4 and/or HF_4 . Typically, the conditioning step is carried out for sixty seconds to three minutes using SiH_4 as the conditioning gas. However, the conditioning gas could be partially or entirely replaced with hydrogen-containing gases such as disilane (Si_2H_2), hydrogen, and/or water vapor whereby the fluorine could be removed (see col. 4, line 63 through col. 5, line 7). Williams et al disclosed all the limitations as claimed herein. Therefore, Williams et al anticipate the claimed process.

Claims 1-4, 6, 11-12 and 22-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Barnes et al.

Barnes et al (5,679,215) disclose a method of in situ cleaning deposits from interior surfaces of plasma processing chamber, the surfaces having at least one of an oxide and hydrocarbon deposited thereon, comprising causing water vapor (second gas) and at least one of SF_6 and NF_3 gas (first gas) to be in the chamber in the presence of a plasma discharge, the vapor reactants chemically reacting with metal oxide and pumping the vaporized deposits of metal oxide. Wherein the water vapor is introduced into the chamber after the fluorine containing gas. Wherein the water vapor is introduced into the chamber before the fluorine containing gas (see claims). In the standard r.f. plasma discharge environment, the SF_6 and NF_3 will be present in their ionic components. The gas and water vapor will facilitate reactions with deposits on the

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interior chamber surfaces. The water vapor or water vapor, hydrogen peroxide vapor mixture may be introduced simultaneously with the SF₆ and NF₃ gases, or the vapor may be introduced before or after the fluoride gas (see col. 4, lines 50-64).

The first cleaning operation steps are to remove all workpieces that have been processed or are to be processed from the interior of chamber 10 and then to isolate sources of the conventional plasma forming gases from conduits connected to port 14 by closing valve 21. Then conduit 26 bubbler 30 is connected to port 15 by opening valve 28. Simultaneously, a source 20 containing SF₆ or NF₃ is connected to port 14 by opening valve 21. Since valve 28 is open, the H₂O vapor or H₂ O and H₂ O₂ mixture vapor from bubbler 30 flow via line 26 and port 15 into chamber 10 while source 24 supplies r.f. energy to coil 18. While H₂ O vapors are flowing through port 15 the SF₆ or NF₃ gases as well as other gases are flowing through port 14. Alternatively, valve 28 is sequentially and cyclically opened and closed between the times when valve 21 is sequentially and cyclically opened and closed. If plural gas sources 20 are connected to port 14 they can be simultaneously or sequentially and cyclically connected to this port (see col. 6, lines 19-37). Barnes et al disclosed all the limitations as claimed herein. Therefore, Barnes et al anticipate the claimed process.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 7, 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnes et al.

Barnes et al were discussed supra. However, the reference fails to disclose that first or second gas is periodically provided into the chamber. Barnes et al disclose that gases are provided simultaneously, before or after fluorine containing gas. Therefore, one of ordinary skill in the art would manipulate the introduction of gases for better and efficient results. Further, it is well known in the art of cleaning to excite the gases outside of the chamber. Therefore, one of ordinary skill in the art would remotely excite the gases to prevent the damage to the chamber.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barnes et al in view of Hatano et al.

Hatano et al (5,709,757) disclose method of dry cleaning a chamber wherein one of metal or metal compound adhering to an inner part of the chamber are removed by introducing fluorine containing gas and alcohol into the chamber; and discharging the cleaning gas (see abstract and claims).

It would have been obvious at the time applicant invented the claimed process to include alcohol as disclosed by Hatano et al into the process of Barnes et al because Hatano et al and

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Barnes et al both in the same field of endeavor and removing metal compound from inside of the chamber.

Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnes et al in view of Williams.

Barnes et al were discussed supra. However, the reference fails to disclose that this process will remove aluminum oxide.

Williams et al were discussed supra. However, the reference fails to provide fluorine containing gas and water vapor together in the chamber.

It would have been obvious at the time applicant invented the claimed process to remove aluminum oxide with the process of Barnes et al because Barnes et al disclose to remove metal oxide from the chamber and one of ordinary skill in the art would expect that aluminum oxide is a metal oxide which would be removed with the same process, since Williams et al disclose that aluminum oxide is removed with the fluorine containing gas. Barnes et al disclose that water vapors are introduced simultaneously, before or after introducing fluorine containing gas. Therefore, one of ordinary skill in the art would manipulate the introduction of water vapor and fluorine containing gas in the chamber for better and efficient results.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saeed T. Chaudhry whose telephone number is (571) 272-1298. The examiner can normally be reached on Monday-Friday from 9:30 A.M. to 4:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Michael Barr, can be reached on (571)-272-1414. The fax phone number for non-final is (703)-872-9306.

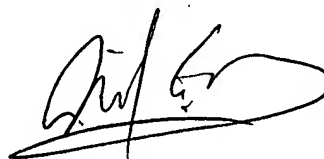
When filing a FAX in Gp 1700, please indicate in the Header (upper right) "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communication with the PTO that are for entry into the file of the application. This will expedite processing of your papers.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (571) 272-1700.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Saeed T. Chaudhry
Patent Examiner

A handwritten signature in black ink, appearing to read "Michael Barr", with a stylized, looping flourish at the end.

MICHAEL BARR
SUPERVISORY PATENT EXAMINER